AMENDMENTS TO THE CLAIMS

Please amend Claims 1, 2, 4, 15 and 16. Please cancel Claim 14.

1. (Currently amended) A method of fabricating a fixed layer for a MRAM device, the method comprising:

providing the fixed layer, the fixed layer comprising:

an antiferromagnetic pinning layer over a substrate;

a ferromagnetic pinned layer over the pinning layer, the pinned layer having a first thickness;

a spacer layer over the pinned layer;

a ferromagnetic reference layer over the spacer layer, the reference layer having a second thickness; and

annealing the fixed layer using a ~~temporal temperature/~~ selected profile of temperature and magnetic field ~~profile~~ as a function of time, ~~the profile having a maximum magnetic field magnitude (H_{anneal}),~~ the profile selected based on the first thickness of the pinned layer and the second thickness of the reference layer, the profile having a maximum magnetic field magnitude (H_{anneal}).

2. (Currently amended) A method of fabricating an MRAM device, the method comprising:

fabricating [[**a**]] the fixed layer by the method of Claim 1, the fixed layer having [[**a**]] the reference layer; and

providing a non-magnetic tunneling layer over the fixed layer.

3. (Original) The method of Claim 2, further comprising providing a ferromagnetic free layer over the tunneling layer.

4. (Currently amended) ~~The method of Claim 1~~ A method of fabricating a fixed layer for a MRAM device, the method comprising:

providing the fixed layer, the fixed layer comprising:

an antiferromagnetic pinning layer over a substrate;

a ferromagnetic pinned layer over the pinning layer, the pinned layer having a first thickness;

a spacer layer over the pinned layer;

a ferromagnetic reference layer over the spacer layer, the reference layer having a second thickness; and

annealing the fixed layer using a selected profile of temperature and magnetic field as a function of time, the profile selected based on the first thickness of the pinned layer and the second thickness of the reference layer, the profile having a maximum magnetic field magnitude (H_{anneal}), wherein a first profile is selected when the first thickness is substantially equal to the second thickness, a second profile is selected when the first thickness is substantially less than the second thickness, and a third profile is selected when the first thickness is substantially greater than the second thickness.

5. (Original) The method of Claim 4, wherein the first profile includes field cooling with an applied magnetic field greater than a minimum field for uniform saturation (H_{sat}) when H_{anneal} is not constrained to be less than H_{sat}.

6. (Original) The method of Claim 4, wherein the second profile includes field cooling with an applied magnetic field greater than a minimum field for uniform saturation (H_{sat}) when H_{anneal} is not constrained to be less than H_{sat}.

7. (Original) The method of Claim 4, wherein the second profile includes soaking with H_{anneal} and field cooling with an applied magnetic field greater than a maximum field for trapping vortices or reversed magnetization (H_{rm}) and less than a low field uniform magnetization boundary (H_{uL}) when H_{anneal} is constrained to be less than H_{sat}.

8. (Original) The method of Claim 4, wherein the second profile includes field cooling with an applied magnetic field greater than a maximum field for trapping vortices or reversed magnetization (H_{rm}) when H_{anneal} is constrained to be less than a low field uniform magnetization boundary (H_{uL}).

9. (Original) The method of Claim 4, wherein the third profile includes field cooling with an applied magnetic field greater than a minimum field for uniform saturation (H_{sat}) when the H_{anneal} is not constrained to be less than H_{sat}.

10. (Original) The method of Claim 4, wherein the third profile includes soaking with H_{anneal} and cooling without an applied magnetic field when H_{anneal} is constrained to be less than a minimum field for uniform saturation (H_{sat}).

11. (Original) The method of Claim 4, wherein the third profile includes soaking with H_{anneal} and field cooling with an applied magnetic field equal to the negative of a maximum field for trapping vortices or reversed magnetization ($-H_{rm}$) when H_{anneal} is constrained to be less than a minimum field for uniform saturation (H_{sat}).

12. (Original) The method of Claim 4, wherein the third profile includes soaking with H_{anneal} and cooling without an applied magnetic field when H_{anneal} is constrained to be less than a low field uniform magnetization boundary (H_{uL}).

13. (Original) The method of Claim 4, wherein the third profile includes soaking with H_{anneal} and field cooling with an applied magnetic field equal to the negative of a maximum field for trapping vortices or reversed magnetization ($-H_{rm}$) when H_{anneal} is constrained to be less than a low field uniform magnetization boundary (H_{uL}).

14. (Canceled)

15. (Currently amended) A method of fabricating a MRAM device, the method comprising:

providing a fixed layer comprising:

an antiferromagnetic pinning layer over a substrate;

a ferromagnetic pinned layer over the pinning layer, the pinned layer having a first thickness;

a spacer layer over the pinned layer;

a ferromagnetic reference layer over the spacer layer, the reference layer having a second thickness; and

annealing the fixed layer using a ~~temporal temperature/~~ selected profile of temperature and magnetic field ~~profile~~ as a function of time, the profile selected based on the first thickness of the pinned layer and the second thickness of the reference layer.

16. (Currently amended) A method of fabricating a MRAM device, the method comprising:

providing a synthetic antiferromagnetic layer having a ferromagnetic pinned layer having a first thickness and a ferromagnetic reference layer having a second thickness; and

annealing the synthetic antiferromagnetic layer using a ~~temporal temperature/~~ selected profile of temperature and magnetic field ~~profile~~ as a function of time, the profile selected based on the first thickness and the second thickness.